Review of Progress Implementation Report for

NIOSH Respiratory Disease Research Program

Submitted by Board of Scientific Counselors

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BSC Working Group Members

Dave Bonauto
Jackie Nowell
Michael Larranaga
Carol Rice

Respiratory Disease Research Program Score Sheet

Directions: For each recommendation listed below, please circle a score for each scoring element and provide a brief justification for the assignment of that score. The work group may provide scores in .5 increments where they deem appropriate. If the group chooses to do that, please put a .5 next to the corresponding number and circle that number.

Recommendations In Progress:

Recommendation
Systems for Surveillance: NIOSH should provide appropriate resources for and engage in high-priority occupational [respiratory] disease surveillance.(p136)

Relevance: 1 2 3 4 5 – **SCORE: 5**
Brief Justification: All of the activities being conducted are directly responsive to the recommendation. NIOSH surveillance products developed prior to 2008 have been maintained and improved (e.g. the NIOSH Work-related Lung Disease Report). NIOSH is leveraging existing population based surveys (e.g. NHANES, BRFSS, and NHIS) to better characterize the burden of occupational respiratory disease. NIOSH resources dedicated to the goal of including industry and occupation into the electronic medical record and other health surveys are of paramount importance. NIOSH is currently partnering with five states, up from four, for occupational asthma surveillance. Health hazard evaluation data are included in surveillance efforts related to flavorings related lung disease.

Sustainability: 1 2 3 4 4.5 5 – **SCORE: 4.5**
Brief Justification: NIOSH is dedicating personnel and other resources to improve occupational respiratory disease surveillance in the US and within selected individual states. Continued allocation of such resources will be necessary to sustain this recommendation. NIOSH should consider the NAS recommendation to develop an occupational respiratory disease surveillance plan (p. 146).

Progress: 1 2 3 4 5 – **SCORE: 5**

Brief Justification: The Respiratory Disease Research program (RDRP) has made substantial progress in implementing this recommendation. The relative absence of data characterizing the burden of occupational respiratory disease in the US was a notable concern in the NAS report and the initiated surveillance activities of the last several years are considerable.

Potential Impact: 1 2 3 4 5 – **SCORE: 4.5**

Brief Justification: More formal efforts to quantify the impact of NIOSH surveillance outputs are appropriate. The time frame for such an evaluation should be lengthy suggesting the evaluation of current outputs might best be viewed several years from now. The National Occupational Respiratory Mortality System appears to have high

utility based on web access data. If industry and occupational data are included within the medical record, the impact will be enormous and valuable for decades to come. State based surveillance programs have identified and promoted prevention of occupational asthma caused by cleaners and disinfectants. Other RDRP program activities relate to this surveillance recommendation and might be recognized as contributing to progress on this recommendation: medical screening programs, digital chest imaging, and the World Trade Center programs. The efforts to have industry and occupational data included in the medical record have fostered significant partnerships with the general public health community.

Recommendation
The committee recommends that the effectiveness of digital radiography in CWP surveillance should be an important continuing research priority, which will extend to all interstitial lung diseases. (p135)

Relevance: 1 2 3 4 5 – **SCORE: 5**

Brief Justification:

NIOSH has taken this recommendation very seriously and provided outstanding leadership in standardizing occupational chest radiography made with digital media. NIOSH has documented the equivalence between ILO classifications based on digital versus radiographic chest films. These research efforts were necessary given the evolving nature of medical care and its reliance on digital chest imaging. NIOSH should be commended in its timely and essential course of research activities in this area. The research effort complements the overall NIOSH support for electronic medical record.

Sustainability: 1 2 3 4 5 – **SCORE: 5**

Brief Justification:

The partnerships developed include the ILO and support from a group of B readers who participated in a collaboration to better understand impact of digital technology. This latter effort resulted in a solid basis for recommendations and products. In an effort to revise rules that specify use of films, NIOSH provided support for dedicated personnel to develop a Notice of Proposed Rulemaking (NPR) and monitor progress of rule-making.

Progress: 1 2 3 4 5 – **SCORE: 5**

Brief Justification:

Major accomplishments include the publication of findings regarding image quality, establishment of a chest image repository, provision of standardized digital images and B viewer software. Moreover, the NPR progressed to a rule in a very short period of time (https://www.federalregister.gov/articles/2012/09/13/2012-22253/specifications-for-medical-examinations-of-underground-coal-miners); this underscores the value of this activity to all stakeholders—industry, health care, workers and their representatives and government.

Potential Impact: 1 2 3 4 5 **– <u>SCORE:</u> 5**

Brief Justification:

The actions taken by NIOSH will substantially speed the transmittal of chest images, decrease time to diagnosis and aid in record retention by decreasing storage space and storage area design considerations.

Recommendation
In the flavoring industry, the RDRP response to the identification of diacetyl-induced bronchiolitis obliterans has led to surveillance efforts in multiple locations in an effort to detect and prevent disease. The evaluation committee agrees that continued surveillance, prevention of exposures, and mechanistic research to better understand this disease should continue to be a high priority for the RDRP. (p134)

Relevance: 1 2 3 4 5 – **SCORE: 5**

Brief Justification:

Diacetyl and its substitutes are important newly recognized hazards. Artificial food flavorings as a group are very broad and ever changing. To have limited inquiry to diacetyl would have been limiting. All of the activities since 2008 have high relevance. Field work is expanding the epidemiology, monitoring the increased use of substitutes, and evaluating controls for workplace exposure. Lab studies are providing the necessary research and models on the family of chemicals that make up food flavorings and their health effects. A criteria document has been produced for regulators and industry. Can guiding principles be identified from this course of inquiry that can be used in other settings, especially exposure prevention?

Sustainability: 1 2 3 4 5 – **SCORE: 4.5**

Brief Justification:

Continued priority status for diacetyl must be balanced against other emerging issues and changes in the flavoring industry. Alternative surveillance activities may be considered, such as a disease registry for obstructive lung disease, including bronchiolitis obliterans. Expanding field studies and laboratory research on substitutes and restrictive disease etiology will be of use to regulators, health care providers and other researchers.

Progress: 1 2 3 4 5 – **SCORE: 5**

Brief Justification:

The progress to date has been impressive. Major accomplishments include progress in assessing the toxicology of food flavoring chemicals being substituted by the industry for diacetyl, assistance to California in development of a CalOSHA standard on artificial food flavorings, a correction procedure to adjust diacetyl concentrations previously measured using the NIOSH Method to account for humidity and a criteria document which includes state-of-the-art control technologies due for publication in the coming months.

Potential Impact: 1 2 3 4 5 **– <u>SCORE:</u> 5**

Brief Justification:

The potential impact is far reaching. The NIOSH criteria document recommends an exposure limit for diacetyl and 2,3-pentanedione and preventive measures designed to reduce or eliminate the adverse health effects of these chemicals. As well, is serves as a tool for the food industry in controlling exposures. It is an evaluation of all known and available scientific information relevant to them. The recommendations are intended for use by OSHA in promulgating a standard. NIOSH's contributions led to development of California's CalOSHA standard and Federal OSHA's enforcement program for popcorn manufacturing. NIOSH's contributions could well lead to elimination of substitute food flavorings. In order to facilitate exposure reduction, it is recommended that specific, proven engineering controls be added to the NIOSH Flavorings website.

Recommendation
In terms of chronic obstructive pulmonary disease (COPD), understanding the contribution of occupational exposures is difficult. To understand this issue, the evaluation committee strongly recommends that, for planning preventive strategies, the RDRP continue to support population-based studies of associations between occupational exposures and COPD to better define groups of workers at greatest risk. (p134)

Relevance: 1 2 3 4 5 – **SCORE: 4.5**

Brief Justification: All of the activities being conducted are directly responsive to the recommendation. NIOSH surveillance products developed prior to 2008 have been maintained and improved (e.g., the NIOSH Work-related Lung Disease Report). NIOSH is leveraging existing population based surveys (e.g., NHANES, MESA, Copenhagen City Heart Study) and other studies on coal mine dust, beryllium, endotoxin, and World Trade Center dust exposures. NIOSH led the effort to collect spirometry data from participants in studies initiated prior to 2008, including NHANES III and MESA. NIOSH plans to analyze current NHANES data to evaluate associations between work-related COPD and determine other attributable risks, including industry-and occupation-specific trends in tobacco use since NHANES III. NIOSH partnered with other CDC divisions to produce the report "Public Health Strategic Framework for COPD Prevention" in 2011. NIOSH has posted software on its website to help surveillance programs evaluate and monitor longitudinal data and engaged external partners to target secondary prevention from both occupational and non-occupational causes of COPD. NIOSH should consider increasing the emphasis on conducting longitudinal studies on high risk populations and developing spirometric reference standards for specific ethnic and racial minorities common in the US population.

Sustainability: 1 2 3 4 5 – **SCORE: 4**

Brief Justification: NIOSH is dedicating personnel and other resources to conduct research, develop education materials (Spirometry posters and training manual, "Public Health Strategic Framework for COPD Prevention", information sheets), and provide tools for longitudinal data analysis (software). NIOSH has worked with spirometer manufacturers to include educational posters with every spirometer shipped. Over 60,000 posters have been delivered and the poster is available in five languages with plans to develop an additional six translations. NIOSH should consider developing metrics to evaluate the impact of their spirometry poster on clinical practice. This is also a research area requiring both the resources of intra- and extra-mural funding programs.

Progress: 1 2 3 4 5 – **SCORE: 4**

Brief Justification:

NIOSH has dedicated personnel and other resources to the prevention, early detection, and management of work-related COPD. NIOSH should consider identifying at-risk populations and developing prevalence data for smoking status by industry and occupation and address smoking in future longitudinal studies. NIOSH has engaged with partners to target secondary prevention from non-occupational causes (smoking, weight gain, sedentary lifestyle and occupational causes (hazardous exposures) but the results of these partnerships have yet to be realized. It is unclear how NIOSH determines which groups of workers are appropriate for targeted studies intended to prevent the onset of COPD.

Potential Impact: 1 2 3 4 5 **– <u>SCORE:</u> 5**

Brief Justification: The changing nature of work (multiple employers, new materials, novel exposures, short-term jobs, multiple jobs at the same time) pose a real challenge to area of research. In 2009, COPD was the 3rd leading cause of death, with 137,353 deaths attributable to the disease. The American Thoracic Society estimates that approximately 15% of COPD cases are attributable to the work environment, highlighting COPD's significance as a major work-related health issue. For these reasons, the potential impact of primary prevention activities, early disease detection, and appropriate management of COPD can have long-lasting positive impacts on the workforce. NIOSH should consider follow up to determine if the training and disseminated tools to improve spirometry have actually improved the quality of surveillance programs using spirometry.

Recommendation
Because the contribution of occupational exposures to the burden of adult asthma is high, work in pursuit of the four WRA subgoals can have a potentially large impact on improved occupational safety and health among the U.S. workforce. (p134)

Relevance: 1 2 3 4 5 **– <u>SCORE:</u> 5**

Brief Justification: The activities conducted since 2008, directly respond to the recommendation. Since 2008, NIOSH has expanded both extramural and intra-mural work-related asthma (WRA) research activities as well as the state-based surveillance co-operative agreement programs. These activities have identified potential and emerging causes of WRA, and led to better estimates of the burden of WRA in the general working population through the BRFSS Asthma Call Back Survey. Special studies were undertaken to characterize exposures and health effects of particular asthma causing agents (e.g. diisocyanates), to evaluate the effects of poor indoor air quality, dampness and mold on the respiratory tract, as well as assessing the health effects of irritant inhalational exposures encountered during natural or man-made disasters. Laboratory work has identified methods for identifying novel indoor air contaminants, and the development of monoclonal antibodies for diisocyanate protein adducts. Concerns from the subgroup suggest some efforts might be undertaken to enhance the recognition among medical clinicians of workplace exposures as a cause of asthma as well as the subsequent clinical evaluation and care of work-related asthma.

Sustainability: 1 2 3 4 5 **– <u>SCORE:</u> 4**

Brief Justification: The current WRA research efforts at NIOSH represent an exemplary partnership between extramural research, state-based surveillance, and NIOSH's intramural research and surveillance program activities. The activities reflect effective utilization of currently available inputs. There is not a clear sense regarding the prioritization of the limited resources for work-related asthma surveillance and prevention activities. Second, some consideration might be given to emphasizing partnerships with health care provider groups for work-related asthma recognition and clinical care, medical screening programs for other specific exposures, and developing a long-term strategic research plan addressing indoor air quality.

Progress: 1 2 3 4 5 **– <u>SCORE:</u> 4**

Brief Justification: Substantial progress has been made in addressing the recommendation. A range of surveillance and research programs have been launched or enhanced since 2008 to further advance progress on this recommendation. Resource constraints limits further progress.

Potential Impact: 1 2 3 4 5 **– <u>SCORE:</u> 5**

Brief Justification: Better population-based estimates of the prevalence of work-related asthma will increase recognition of WRA as a public health problem. The large number of publications within the scientific peer-reviewed literature demonstrates NIOSH success in disseminating its research finding to the scientific community. These publications documenting research characterizing emerging or known causes of WRA and contaminants in indoor air will provide the foundation for evidence-based clinical decision making for WRA causation and workplace exposure assessment.